WHAT IS CLAIMED:

1. A method of fast restoration in a data network, comprising:

employing dedicated restoration hardware elements in a network node; and
linking said dedicated restoration hardware elements via a high-speed bus.

2. The method of claim 1, where said dedicated restoration hardware comprises a connection manager and an equipment manager.

3. The method of claim 1, further comprising connecting all optical inputs and outputs to specialized controllers, each also connected to the high-speed bus

4. The method of claim 3, further comprising connecting a switch manager to said high-speed bus, where said switch manager controls all switch elements.

5. The method of any of claims 1-4, where the signal parameters from all input and output optical signals are repeatedly updated on the high-speed bus.

6. The method of claim 5, where said updating occurs in near real time, and in not longer than 125 μsec intervals.

7. The method of claim 6, where said signal parameters include at least one of optical power (OP), optical signal to noise ratio (OSNR), and threshold crossings

of those parameters.

8. The method of claim 7, where the optical parameters are measured on both the incoming signal (receive side) and outgoing signal (transmit side).

9. A method of continuous monitoring of optical signals in a data network node, comprising:

> continually monitoring defined optical signal parameters; and
> continually communicating the monitored results to the node's controllers.

10. The method of claim 9, where the optical signal parameters include at least one of optical power (OP), optical signal to noise ratio (OSNR), and threshold crossings of those parameters.

11. The method of claim 10, where the optical parameters are measured on both the incoming signal (receive side) and outgoing signal (transmit side).

12. The method of claim 10, where the thresholds for each of the optical parameters can be set by the user.

13. The method of any of claims 9-12, where the monitoring results are updated at least every 125 microseconds.

14. A system for continuous monitoring of input signals in a data network node, comprising:

signal parameter measuring devices;

a high speed bus connecting them with the node controllers.

15. The system of claim 14 where the node controllers comprise a connection manager and an equipment manager.

16. The system of claim 15, where the signal parameter measuring devices measure at least one of the following parameters:

optical power (OP)

optical signal to noise ratio (OSNR); and

threshold crossings of those parameters.

17. The system of any of claims 14-16, where the system further operates to accomplish restoration by identifying a defined change in said signal parameters, and reconfiguring the nodal switch fabric.

18. A data network wherein high speed restoration occurs, comprising nodes comprising the systems of any of claims 14-17.

19. A frame protocol for the continuous monitoring of a network node, comprising:

a start of frame flag;
all input to output port associations; and

optical signal parameters for each port.

20. The protocol of claim 19, additionally comprising an end of frame flag.

21. The protocol of claim 20, where said optical signal parameters include at least one of optical power (OP), optical signal to noise ratio (OSNR), and threshold crossings of those parameters.

22. The protocol of claim 21, where the optical parameters are measured on both the incoming signal (receive side) and outgoing signal (transmit side).

23. Apparatus for continual signal performance monitoring in an optical data network node comprising:

devices to monitor optical signal performance parameters;

dedicated hardware for formatting the monitoring results; and

a high-speed bus.

24. The apparatus of claim 23, where communications on the high-speed bus is restricted to messages communicating or relating to:

signal performance data,

the nodal switch map, and

restoration or reconfiguration.